

Small Localized Species of *Epaphius* (Coleoptera, Trechinae) from Northern Hokkaido, Northeast Japan¹⁾

By

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上野 俊一*：北海道北部に固有のキイロチビゴミムシ亜属の小型種

No localized species of apterous light-coloured trechine beetles have ever been known in northern Hokkaido, although more than a dozen of them have been recorded from the southern half of the island and the accessory islet Rishiri-tô. In the summer of 1990, I had an opportunity to make an extensive survey of the beetle fauna in that area (called Dôhoku area), sponsored partly by the Natural History Research Project of the Japanese Islands (National Science Museum, Tokyo) and partly by the National Survey of the Natural Environment Project (Nature Conservation Bureau, Environment Agency, Japan). Aided by Professor SATÔ, Professor NISHIKAWA and Ms. SAITO, I visited many places in the wide area north of 44°N in latitude and made rather intensive collectings. However, the results obtained are not satisfactory, mainly because the natural environment of Dôhoku area is, as was expected, rather monotonous and the fauna is relatively simple. For all these unfavourable situations, we were still able to make some important discoveries, among which were those of small localized trechine beetles at two stations.

After a careful study, it has become apparent that these trechines belong to the *hashimotoi* complex of *Epaphius* and, though almost indistinguishable by external morphology, can be classified into two species on the basis of genitalic differentiation. One of them is closely related to *Trechus* (*Epaphius*) *matsumotoi* endemic to the Island of Rishiri-tô and the other to *T. (E.) hashimotoi* known only from Mt. Shokanbetsu-daké in western Hokkaido. Thus, the *hashimotoi* complex comprises four known species sporadically distributed along the western side of the main island. Unfortunately, we failed in finding any trechine of the same group on the main part of the Teshio Mountain Range, which must harbour certain species as it lies between Mt. Shokanbetsu-daké and the localities of the new forms.

Recently, LAFER (1989, pp. 141-142) demonstrated that five distinctive species of *Epaphius* occur in the Maritime Territory of the Soviet Far East. None of them appear directly related to the *hashimotoi* complex, which might be considered as an indication that the species-complex became differentiated somewhere in northern Hokkaido. However, this inference seems im-

1) This study is supported in part by the Grant-in-aid for Scientific Research No. 03640633 from the Ministry of Education, Science and Culture, Japan.

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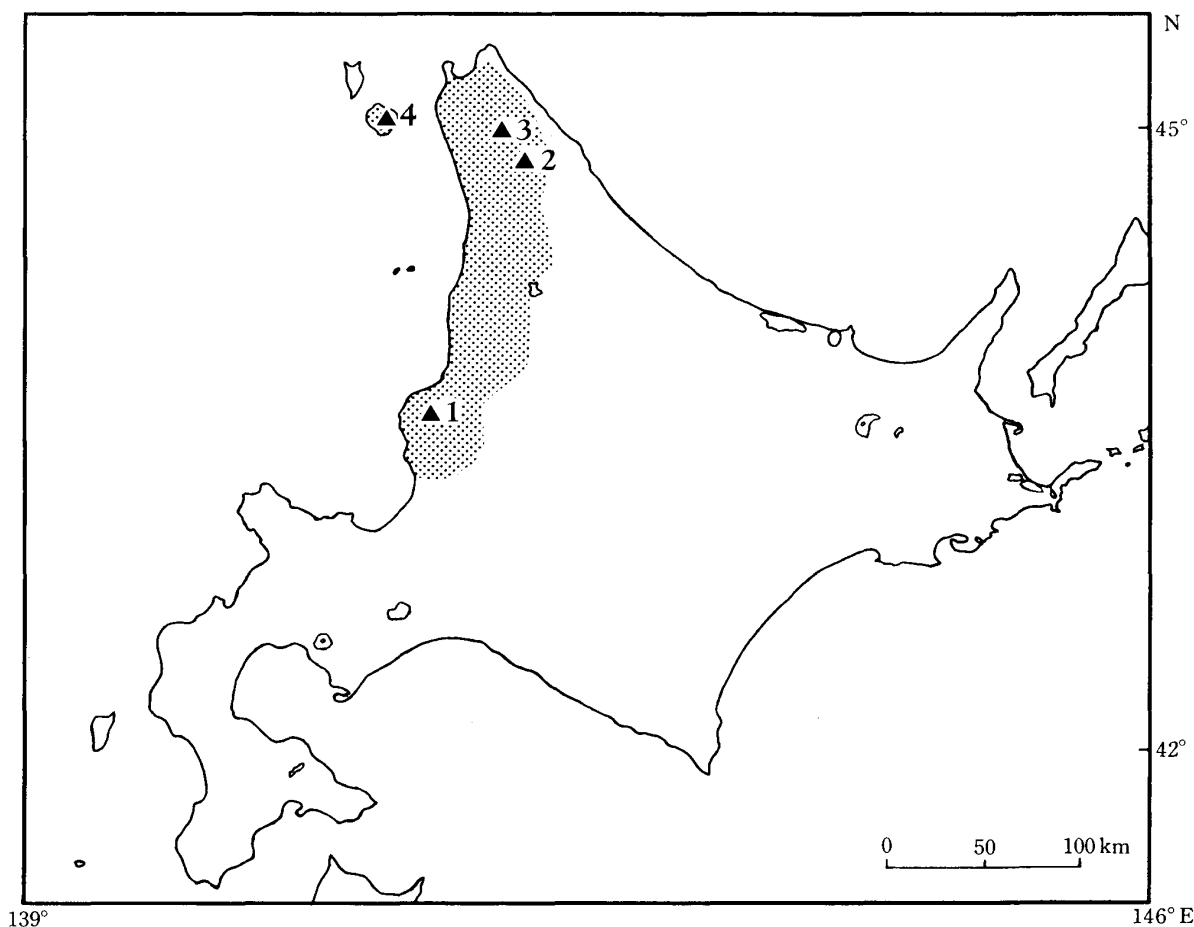


Fig. 1. Map showing localities of the members of the *hashimotoi* complex of *Trechus* (*Epaphius*); fine dots indicate probable range of distribution of the species-complex. — 1, Mt. Shokanbetsu-daké (*T. hashimotoi* S. UENO); 2, Mt. Shirikoma-daké (*T. acco* S. UENO, sp. nov.); 3, Source of the Sekitanbetsu-gawa River (*T. nishikawai* S. UENO, sp. nov.); 4, Mt. Rishiri-zan (*T. matsumotoi* S. UENO).

plausible, since an alpine species of the complex (*T. matsumotoi*) occurs on the Island of Rishiri-tô which may have served as a stepping stone from the continent to Hokkaido. Further investigations are needed for clarifying the origin of the species-complex, both in Hokkaido and in the Maritime Territory.

In the present paper, the two new species will be described, new collecting data of *T. matsumotoi* will be recorded, and for reference, bibliography of *T. hashimotoi* will be given. The abbreviations used in this paper are the same as those explained in other papers of mine.

I wish to express my heartfelt thanks to Professor Masataka SATÔ of Nagoya Women's University, Professor Yoshiaki NISHIKAWA of Ohtemon-Gakuin University, and Ms. Akiko SAITO of the Natural History Museum and Institute, Chiba, for their kind collaboration through the field works.

Trechus (*Epaphius*) *hashimotoi* S. UENO, 1961

Trechus (*Epaphius*) *hashimotoi* S. UENO, 1961, Mem. Coll. Sci. Univ. Kyoto, (B), 28, p. 337, figs. 1-8; type locality: Mt. Shokanbetsu-daké; 1985, Coleopt. Japan Col., Osaka, 2, p. 67, pl. 13, fig. 13.

Epaphius hashimotoi: CASALE & LANEYRIE, 1982, Mém. Biospéol., 9, p. 79.

No additional record.

Notes. This species seems restricted to the subalpine/alpine zone of Mt. Shokanbetsu-daké lying on the western coast of central Hokkaido. It has not been collected in the vicinities of the Uryû-numa Moor lying on the eastern slope of the mountain at an elevation of about 850 m, though that area has been repeatedly investigated by experienced entomologists. Its type material was obtained from beneath large stones deeply embedded in the moist soil, but the trechine may be primarily humicolous like its close relatives and could be found from under dead leaves in subalpine birch shrubbery.

***Trechus (Epaphius) acco* S. UÉNO, sp. nov.**

(Figs. 2-3)

Length: 2.90–3.20 mm (from apical margin of clypeus to apices of elytra).

Closely allied to *T. hashimotoi*, but readily distinguished from it by configuration of its prothorax, which is evidently longer with the sides more gradually convergent posteriad. Also different from *T. hashimotoi* in coloration, state of elytral stria 5, configuration of aedeagus, and some other details.

Colour light reddish brown, shiny, somewhat iridescent on elytra; palpi, apical halves of antennae, epipleura and legs yellowish brown.

Head as in *T. hashimotoi*, but with longer and less convex genae which are two-fifths to a half as long as eyes; antennae obviously thinner, either reaching basal fourth of elytra or extending a little beyond that level, with segments 7–10 less stout and more cylindrical, each about twice as long as wide.

Pronotum longer and less convex than in *T. hashimotoi*, widest at about two-thirds from base or a little before that level, and much more gradually narrowed towards base than towards apex; PW/HW 1.24–1.32 (M 1.27), PW/PL 1.37–1.45 (M 1.41), PW/PA 1.39–1.48 (M 1.43), PW/PB 1.23–1.28 (M 1.24); sides more narrowly bordered than in *T. hashimotoi*, strongly and rather briefly arcuate in front, very feebly so behind the widest part, almost straight before hind angles, and without appreciable ante-basal sinuation; apex either straight or very slightly emarginate, with front angles rounded off; base wider than apex, PB/PA 1.10–1.20 (M 1.15), gently arcuate at middle, shallowly sinuate on each side, and roundly oblique close to each hind angle, which is very obtusely denticulate; surface sculpture as in *T. hashimotoi*, though discal foveoles are usually absent even in ♂.

Elytra similar to those of *T. hashimotoi* except for striation; EW/PW 1.42–1.54 (M 1.50), EL/EW 1.36–1.43 (M 1.40); disc often depressed in basal two-thirds; sides more feebly arcuate, especially behind shoulders; striae 1–4 as in *T. hashimotoi*, 5 much shallower than the inner ones, sometimes obsolete and only indicated by a row of fine punctures, 6–7 still shallower and fragmentary, often obliterated, 8 deeply impressed behind the middle set of marginal umbilicate pores; scutellar striole fairly long; apical striole short though deep, usually free at the anterior end which usually curves inwards and is often directed to the terminus of stria 3 (rarely joining stria 3 on one elytron); chaetotaxy and other details as in *T. hashimotoi*.

Legs somewhat slenderer than in *T. hashimotoi*.

Male genital organ similar to that of *T. hashimotoi*, but different from the latter in configuration of aedeagus, above all of basal part and apical lobe. Aedeagus a little more than one-fourth as long as elytra, fairly high at middle though hardly arcuate, and rather rapidly narrowed towards apex in profile, with large elongate basal part and relatively short apical lobe; basal part not strongly bent ventrad, almost straight, deeply emarginate at the sides of basal orifice, and provided with a narrow hyaline sagittal aileron; apical lobe gradually narrowed towards the tip, which is obliquely subtruncated in dorsal view and obtusely pointed in lateral view; ventral margin straight at middle in profile. Inner sac covered with scales and teeth, the latter of which are well sclerotized on the ventral and left ventral sides; no differentiated copulatory piece. Styles large and very wide, each usually bearing four setae at the ventral half of apical margin.

Type series. Holotype: ♂, 14-VIII-1990, S. UÉNO leg. Allotype: ♀, same date, Y. NISHIKAWA leg. Paratypes: 6 ♂♂, 2 ♀♀, same date, S. UÉNO, Y. NISHIKAWA & A. SAITO leg. Deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo, with the exception of a paratype which is preserved in the collection of the Department of Animal Sciences, Natural History Museum and Institute, Chiba.

Type locality. Mt. Shirikoma-daké, eastern foot at an altitude of 50 m, in Nakatonbetsu-chô of Sôya Province, northern Hokkaido, Northeast Japan.

Notes. Mt. Shirikoma-daké (532 m in height) lies on the Tenpoku Hills, which are separated from the Teshio Hills by the deep valley of the Teshio-gawa River, and is about 144 km distant to the north-northeast from Mt. Shokanbetsu-daké of the Mashiké Hills, the type locality of *T. hashimotoi*. *Trechus acco* is therefore completely isolated from *T. hashimotoi*, though their localities are distributed along the western coast of Hokkaido.

Unlike *T. hashimotoi*, this new species is by no means alpine or subalpine, since the only known habitat of the beetle is located in a birch forest at the eastern foot of Mt. Shirikoma-daké only 50 m above sea-level. The forest bears a thick undergrowth of dwarf bamboo, among the roots of which lives the trechine beetle. It can be collected by sifting moist dead leaves accumulated among the roots, though its occurrence is rather sporadic. Careful searches were made at higher places to the top of the mountain, but we were unable to find out any other forests that harboured *T. acco*.

This new species is named after Ms. Akiko SAITO, whose first name is spelled in a Latinized form.

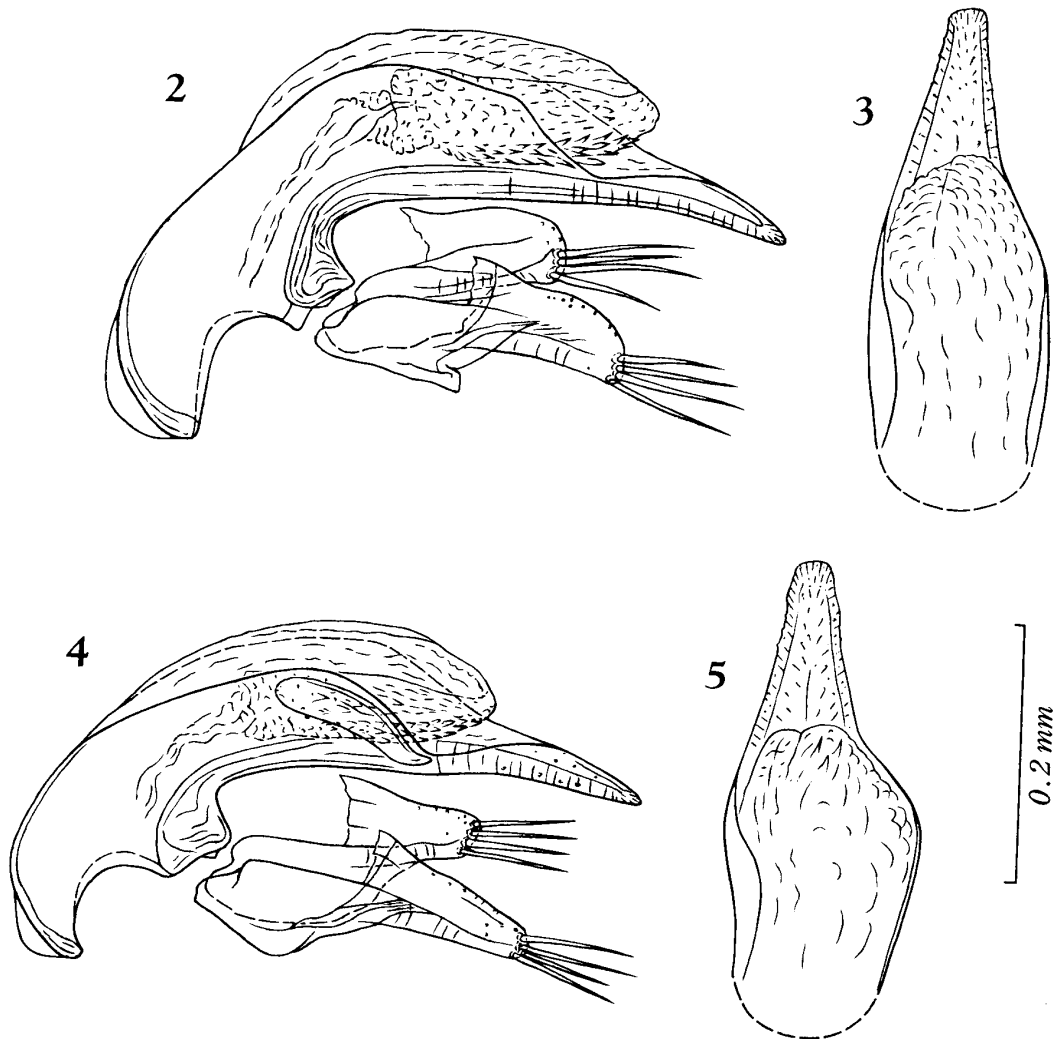
***Trechus (Epaphius) nishikawai* S. UÉNO, sp. nov.**

(Figs. 4-5)

Length: 2.70-3.20 mm (from apical margin of clypeus to apices of elytra).

Closely allied to *T. matsumotoi* and externally almost identical with *T. acco*, only differing from them in conformation of male genitalia.

Colour as in *T. acco*. Head and prothorax very similar to those of *T. acco*; elytra also similar to those of *T. acco*, but outer striae are usually weaker, stria 5 being very faint and 6-7 nearly obsolete. Standard ratios of body parts as follows: PW/HW 1.21-1.35 (M 1.27), PW/PL 1.37-1.48 (M 1.42), PW/PA 1.36-1.50 (M 1.43), PW/PB 1.25-1.33 (M 1.28), PB/PA 1.07-1.17 (M 1.11), EW/PW 1.41-1.56 (M 1.49), EL/EW 1.31-1.45 (M 1.40).



Figs. 2-5. Male genitalia of *Trechus* (*Epaphius*) spp.; left lateral view (2, 4), and apical part of aedeagus, dorso-apical view (3, 5). — 2-3. *T. (E.) acco* S. UÉNO, sp. nov., from Mt. Shirikoma-daké. — 4-5. *T. (E.) nishikawai* S. UÉNO, sp. nov., from the source of the Sekitanbetsu-gawa River.

Male genital organ similar to that of *T. matsumotoi*, but different from the latter in configuration of left aedeagal wall, apical lobe, and particularly copulatory piece. Aedeagus a little more than one-fourth as long as elytra, hardly arcuate at middle, and widely membranous on dorsum, with the left wall much more reduced than the right and laterally expanded; basal part large, moderately curved ventrad, and very deeply emarginate at the sides of basal orifice, with small hyaline sagittal aileron; apical lobe long, broad at the base, and gradually narrowed towards subtruncated apex; viewed laterally, apical lobe slightly curved ventrad and gradually narrowed towards the tip which is pointed; ventral margin very slightly convex behind the middle in profile. Inner sac covered with numerous scales and teeth, and armed at the left side with a fairly large copulatory piece, which lies obliquely with the apex on the ventral wall of aedeagus; copulatory piece elongate, narrowed towards apex, lightly arcuate, somewhat sigmoidally curved in apical part, and ending in a pointed tip. Styles as in *T. matsumotoi*; each usually provided with four apical setae.

Type series. Holotype: ♂, allotype: ♀, 13-VIII-1990, S. UÉNO leg. Paratypes: 20 ♂♂, 6 ♀♀, same date, S. UÉNO, Y. NISHIKAWA & M. SATÔ leg. Deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo. A pair of the paratypes are in the collection of the Department of Animal Sciences, Natural History Museum and Institute, Chiba.

Type locality. Source of the Sekitanbetsu-gawa River, 170 m in altitude, in Sarufutsu-mura of Sôya Province, northern Hokkaido, Northeast Japan.

Notes. It is most unexpected that the Sekitanbetsu population of *Epaphius* belongs to a species more closely related to *T. matsumotoi* of the Island of Rishiri-tô than to *T. acco*, whose type locality is only 24.3 km distant to the southeast, in spite of the fact that it is almost indistinguishable from the latter in external morphology. It is true that Sekitanbetsu is located on the Sôya Hills, which are considered by geographers to be separated from the Tenpokus, but the two localities lie on a continuous low watershed ridge, even though the lowest point between them is only 110 m above sea-level. Besides, neither of the trechine beetles is a high altitude inhabitant; *T. acco* occurs just above the alluvium of the Tonbetsu-gawa River only 50 m above sea-level, while the habitat of *T. nishikawai* is located just below the watershed ridge which merely attains to a height of 200 m. This means that any physical barrier does not appear to exist between the two localities, and yet reproductive isolation of *Epaphius* seems to have taken place between them.

Trechus nishikawai is also similar to *T. acco* in the environmental condition of its habitat. All the specimens of the type series were found in a small depression at the northern side of the highest point of Route 724, which leads from Toyotomi in the west to Hamatonbetsu in the east between 45°4' and 8°N. The depression lay in a birch forest and was covered with undergrowth of dwarf bamboo, whose entangled roots embraced dead birch leaves and offered a favourable habitat for the trechine beetle. It is possible that in northern Hokkaido, this type of habitat is usual for low altitude species of apterous light-coloured trechines, and this may be why they are localized like high altitude forms.

This new species is dedicated to Professor Yoshiaki NISHIKAWA, who has always helped me in searching for ground-living beetles.

***Trechus (Epaphius) matsumotoi* S. UÉNO, 1984**

Trechus (Epaphius) matsumotoi S. UÉNO, 1984, Bull. natn. Sci. Mus., Tokyo, (A), 10, p. 139, figs. 2-4; type locality: Chôkan-yama on Mt. Rishiri-zan; 1985, Coleopt. Japan Col., Osaka, 2, p. 67.

Additional specimens examined. 3 ♂♂, 6 ♀♀, Mt. Rishiri-zan, Chôkan-yama 1,250 m alt., Higashirishiri-chô, Is. Rishiri-tô off northern Hokkaido, 8-VIII-1990, S. UÉNO & Y. NISHIKAWA leg. (NSMT & Mus. Chiba); 1 ♂, 1 ♀, Mt. Rishiri-zan, 1,380 m alt. on NNW slope, Higashirishiri-chô, 8-VIII-1990, M. SATÔ leg. (NSMT); 3 ♂♂, 1 ♀, Mt. Rishiri-zan, 1,400 m alt. on NNW slope, Higashirishiri-chô, 8-VIII-1990, Y. NISHIKAWA leg. (NSMT); 1 ♂, 1 ♀, Mt. Rishiri-zan, 430 m alt. on W slope, Rishiri-chô, 7-VIII-1990, S. UÉNO & Y. NISHIKAWA leg. (NSMT).

Range. Endemic to higher parts of Mt. Rishiri-zan on the Island of Rishiri-tô off northern Hokkaido, Northeast Japan.

Notes. This species is somewhat larger on an average than the mainland forms; it measures 2.95–3.30 mm from the clypeal apex to the apices of elytra. Its habitats are usually found in the alpine zone of Mt. Rishiri-zan above 1,150 m in altitude, but on the western slope of the volcano, a pair of the specimens of this species were sifted out from moist dead leaves taken from among roots of dwarf bamboo in a birch forest at an altitude of only 430 m. In the alpine zone, it is usually found from under dead leaves in shrubberies of dwarf birch.

要 約

北海道道北地方の本土側では、分布の局限された淡色無翅のチビゴミムシ類が、これまでにまったく知られていなかった。この地域にはとくに高い山がなく、気候が寒冷なうえに植生も単調で、チビゴミムシ類の種分化をうながすような要因がほとんど認められない。ただ、海上に孤立した利尻火山の高山帯からは固有種が知られ、その近縁種が増毛山地の暑寒別岳の高山帯に生息するので、北海道の西側に沿う分布の経路があったのではないかと考えられていた。

1990年8月に実施した現地調査で、利尻、礼文の両島を含む道北地域を、広範かつ綿密に調べた結果、宗谷丘陵の石炭別川源頭部と、天北山地の知駒岳とで、淡色小型のチビゴミムシ類が発見された。いずれもキイロチビゴミムシ亜属のもので、利尻山などの固有種と同じ系列に属し、外見的には区別が困難なほどたがいによく似ている。しかし、雄生殖器官の分化状態は、それぞれが独立の種であることを示している。これらの2新種を含めた同群の既知種とその産地は、次のようになる。

1. ショカンベツチビゴミムシ *Trechus (Epaphius) hashimotoi* S. UÉNO, 1961 — 暑寒別岳 (増毛山地)。
2. アッコチビゴミムシ *T. (E.) acco* S. UÉNO, sp. nov. — 知駒岳 (天北山地)。
3. ソウヤチビゴミムシ *T. nishikawai* S. UÉNO, sp. nov. — 石炭別川源頭部 (宗谷丘陵)。
4. マツモトチビゴミムシ *T. matsumotoi* S. UÉNO, 1984 — 利尻山 (利尻島)。

利尻山や暑寒別岳の場合とちがって、道北地方の本土側で発見された2新種は、いずれも標高の低い場所にすみ、緯度が高いことを考慮にいれても高山性とはいえない。それでも種分化が起こっている理由を説明するのは容易ではないが、ネマガリダケを下生えにするカバ林にかぎって生息すること、なんらかの関係があるのかもしれない。今回の調査では発見することができなかったが、既知種の分布模様からみて、天塩山地にも同系種が生息することはほぼ確実だと思われる。将来、対岸の沿海州における事情がもっとよくわかってくれば、日本海の北部をまたぐチビゴミムシ類の拡散と、北海道北西部における分化の過程が、かなりの程度まで詳しく解析できるようになることと期待される。

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